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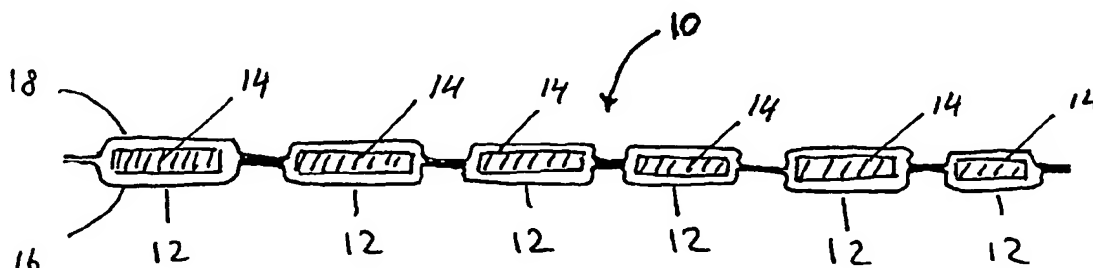
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(54) Title: A MAGNETIC STRIP



(57) Abstract: The invention provides a magnetic strip (10) that comprises a series of magnet (14), a flexible material strip (12) locating and at least in part enclosing each surface of each magnet to define a longitudinal flexible arrangement capable of coupling to itself, a magnetisable material or to another magnet.

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## A MAGNETIC STRIP

Field of the Invention

5           The present invention relates to a magnetic strip.  
The present invention also relates to an arrangement for  
packaging magnets.

Background of the Invention

10           A magnet is often used to hold an article. A typical  
magnet is composed of a hard, metallic material and, in  
use, attractive magnetic forces between the magnet and a  
magnetisable material are exploited to hold the article.  
Magnets find application in heavy industry, but are also  
15   used for domestic purposes. An example for the latter is  
the well-known fridge-magnet. Such a magnet is arranged to  
hold an article on a metallic door of a refrigerator. In  
this or similar applications the article is clamped  
between a metallic surface and a face of the magnet or  
20   alternatively the article is attached to the magnet which  
may be in direct contact with the metallic surface. Care  
must be taken to avoid that the magnet does not scratch or  
otherwise damages the article or the metallic surface.

25   Summary of the invention

In a first aspect the present invention provides a  
magnetic strip comprising:

- a series of magnets arranged to magnetically couple with  
a magnetisable material or to another magnet and
- 30   • a flexible material strip locating and at least in part  
enclosing each surface of each magnet to define a  
longitudinal flexible arrangement capable of coupling to  
itself, the magnetisable material or the other magnet.

The flexible material preferably is provided in form of two layers between which each magnet is positioned and which are joined together to locate each magnet. The  
5 two layers most preferably are substantially identical and preferably are welded together.

The magnets preferably have a substantially cylindrical shape which has a cross-section that is substantially round.

10 The flexible material may entirely enclose each magnet and preferably comprises a polymeric material.

The magnets preferably are located remote from each other.

Each of the magnets within the magnetic strip  
15 preferably is oriented such that the polarity of the magnets is substantially uniform relative to the flexible material. The magnets preferably comprise a rare earth material.

The magnetic strip may be provided in form of a  
20 continuous rope-like strip.

The magnetic strip may comprise a label which may be used for advertising purposes and may also comprise at least one means for carrying an article such as a hook.

The above-defined magnetic strip has a range of  
25 applications. The magnetic strip may, for example, be used to locate the article on a magnetisable material such as a door of a refrigerator. The flexible material reduced likelihood of damaging or scratching of the article or of the magnetisable material by the magnet.

30 The magnetic strip preferably comprises a series of magnets of high strength. The magnetisable material to which, in use, at least one of the magnets attaches may be the article itself or another one of the magnets of the

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magnetic strip. For example, the magnetic strip may be used to enclose the article by forming a closed loop with individual magnets of the strip clipping to each other. Usually the magnetic strip does not need to be adjusted to hold the article. The article may be one of many articles and the strip may be arranged to hold together all of the articles. The strip may hold together shower curtains and may also be used to secure fly-screen on cars or tents. Further, the strip may be used to hold together garments, to hold name-tags, and may find application as a cloth peg or may even be used to hold doors open.

In general the magnetic strip may be used for a novel way of packaging, distributing, selling and using magnets.

The magnetic strip may be sold like lengths of a chain or a rope cut to a required length. The flexible material may be selected to suit specific requirements such as cost efficiency for packaging and durability for long term applications. The magnetic strip may be rolled or pulled out to the required length and cut to that length. The user may then cut it to various smaller lengths, individual sections containing only one magnet or even remove the flexible material exposing the individual magnets. Once the user has cut the magnetic strip to the useable required length, the magnetic strip may be applied to a ferrous metal surface (such as the wall of a steel garden shed) and the magnetic strip will adhere to that surface. The magnetic strip may then be used to adhere to other ferrous objects such that a rack of the objects is formed. Should the user wish to apply the magnetic strip to a non-magnetic surface the magnetic strip may be glued, staples, tied or otherwise adhered to the non-magnetic surface. A person skilled in the art will appreciate that many more applications are possible.

According to a second aspect of the present invention there is provided an arrangement for packaging magnets, the arrangement comprising:

- 5           • a plurality of magnets and
- a plurality of pockets, the pockets being connected by a flexible material and each of the pockets locating one of the magnets.

Each of the pockets preferably is formed from a flexible material such as a polymeric material.

10

The arrangement most preferably is formed from two layers of a flexible material.

In one embodiment of the present invention, the arrangement for packing magnets is provided in form of a strip. In this case the pockets may be closed and may be coated or charged with a substance that reduces rusting of the magnets. Magnets such as NdFeB magnets rust relatively quickly and the substance therefore may reduce deterioration of the magnets. The substance may be provided in form of a coating on the inside of the pockets or, alternatively, the substance may also be provided in form of a fluid such as a liquid or a gas.

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According to a third aspect of the invention there is provided a method of producing a magnetic strip, the method comprising the steps of:

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- providing two layers of a flexible material,
- positioning a series of magnets between the two layers and
- joining the two layers to locate the magnets
- 30   whereby a magnetic strip is formed that is capable of coupling to itself, a magnetisable material or another magnet.

The joining of the two layers may take place in a

- 5 -

sequence of discrete steps after an individual one of the magnets is positioned. Alternatively, the two layers are joined when more than one magnet is positioned between the layers.

5           The step of joining the two layers preferably is conducted such that the magnets are enclosed. Joining the two layers may be effected by gluing, sewing or stapling but, especially if the flexible material is polymeric, comprises welding such as high frequency welding. The two  
10 layers of the flexible material preferably are provided separately from each other and most preferably are provided in form of two strips which may be substantially identical. The method preferably is a continuous process for the production of a continuous length of the magnetic  
15 strip.

Preferred embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings.

## 20   Brief Description of the Drawings

Figure 1 shows a schematic representation of a magnetic strip according to an embodiment of the present invention and

Figure 2 shows a cross-sectional representation of  
25 the magnetic strip.

## Detailed description of preferred embodiments.

Referring to Figures 1 and 2, a magnetic strip according to an embodiment of the present invention is now  
30 described. The Figures show a magnetic strip 10 comprising a flexible material 12 locating magnets 14. In this example the flexible material 12 is waterproof.

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The flexible material 12 may be provided in form a thin polymer of acetate, styrene or PVC as used in packaging materials. Alternatively, the flexible material 12 may comprise a fiber reinforced PVC sheet or urethane.

5 This is particularly advantageous for applications requiring durability and weatherproofing. As the thickness of the flexible material 12 influences the useful strength of the invention a compromise between durability and required magnetic strength needs to be found.

10 In another embodiment of the invention the magnetic strip 10 forms an arrangement for packaging magnets and comprises a plurality of pockets that are joined together and are used to accommodate the magnets. In this case the magnetic strip is also composed of a waterproof polymeric  
15 material. The magnetic strip may incorporate high strength magnets such as those made of the rare earth alloy NdFeB (Neodymium Iron Boron). The use of these magnets improve the coupling strength of the magnetic strip. One the other side high strength magnets are difficult to handle and to  
20 separate in large quantities and this embodiment of the invention therefore also relates to packaging advantages. By packaging the magnets according to the above-described method, the NdFeB magnets become easy to handle and to separate as the flexible sheet material provides a means  
25 of leverage between the magnets. It also prevents the magnets from chipping and from corrosion providing extended life for the magnets.

A method of producing the magnetic strip according to another embodiment of the invention is now described.  
30 Initially two continuous rolls of 50 mm wide strips of fibre reinforced PVC sheeting are provided. The strips are brought together with a magnet positioned between them. The two strips covering the magnet are then welded

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together around one of the magnets using high frequency welding whereby the magnet is encapsulated in hermetically sealed capsules. The next magnet is then inserted between the two strips at a distance of approximately 50 mm behind the previous (first) magnet and the process of welding the strips together around the second individual magnet is repeated. This process is continuously repeated until one of the strips of the fibre reinforced PVC sheeting runs out. If one of the strips runs out, it is joined to a new roll of the same material and the process recommences.

Although the invention has been described with reference to particular examples, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.



The claims defining the invention are:

1. A magnetic strip comprising:

- a series of magnets arranged to magnetically couple with  
5 a magnetisable material or to another magnet and
- a flexible material strip locating and at least in part  
enclosing each surface of each magnet to define a  
longitudinal flexible arrangement capable of coupling to  
itself, the magnetisable material or the other magnet.

10 2. The magnetic strip as claimed in claim 1 wherein the  
flexible material is provided in form of two layers  
between which each magnet is positioned and which are  
joined together to locate each magnet.

15 3. The magnetic strip as claimed in claim 2 wherein the  
two layers are substantially identical.

20 4. The magnetic strip as claimed in any one of the  
preceding claims wherein the flexible material entirely  
encloses each magnet.

25 5. The magnetic strip as claimed in any one of the  
preceding claims wherein the magnets have a substantially  
cylindrical shape which has a cross-section that is  
substantially round.

30 6. The magnetic strip as claimed any one of the  
preceding claims wherein the flexible material is a  
polymeric material.

7. The magnetic strip as claimed in any one of the  
preceding claims wherein the magnets are located remote

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from each other.

8. The magnetic strip as claimed in any one of claims 2 to 7 wherein the two layers are welded together.

5

9. The magnetic strip as claimed in any one of the preceding claims wherein each of the magnets within the strip is oriented such that the polarity of the magnets is substantially uniform relative to the flexible material.

10

10. The magnetic strip as claimed in any one of the preceding claims comprising rare-earth magnets.

11. The magnetic strip as claimed in any one of the preceding claims provided in form of a continuous rope-like strip.

12. The magnetic strip as claimed in any one of the preceding claims comprising a label which may be used for advertising purposes.

25

13. The magnetic strip as claimed in any one of the preceding claims comprising at least one means for carrying an article.

14. A method of producing a magnetic strip, the method comprising the steps of:

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- providing two layers of a flexible material,
  - positioning a series of magnets between the two layers,
  - joining the two layers to locate the magnets
- whereby a magnetic strip is formed that is capable of coupling to itself, a magnetisable material or another

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magnet.

15. The method as claimed in claim 14 wherein the joining  
of the two layers takes place in a sequence of discrete  
5 steps after an individual one of the magnets is  
positioned.

16. The method as claimed in claim 14 wherein the two  
layers are joined when more than one magnet is positioned  
10 between the layers.

17. The method as claimed in any one of claims 14 to 16  
wherein the two layers are substantially identical.

15 18. The method as claimed in any one of claims 14 to 17  
wherein the step of joining the two layers is conducted  
such that the magnets are enclosed.

19. The method as claimed in any one of claims 14 or 18  
20 wherein the two layers of the flexible material are  
provided separately from each other.

20. The method as claimed in claim 19 wherein the two  
layers are provided in form of two strips.

25

21. The method as claimed in any one of claims 14 to 20  
wherein the step of joining the two layers comprises  
welding.

30 22. The method as claimed in any one of claims 14 to 21  
being a continuous process for the production of a  
continuous length of the magnetic strip.

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23. A magnetic strip produced by the method as claimed in any one of claims 14 to 22.

24. An arrangement for packaging magnets, the arrangement  
5 comprising:

- a plurality of magnets and
- a plurality of pockets, the pockets being connected by a flexible material and each of the pockets locating one of the magnets.

10

25. The arrangement as claimed in claim 24 wherein each of the pockets is formed from a flexible material such as a polymeric material.

15 26. The arrangement as claimed in claim 24 or 25 formed from two layers of a flexible material.

27. The arrangement as claimed in any one of claims 24 to 26 provided in the form of a strip.

20

28. The arrangement as claimed in 27 comprising a single row of magnets and wherein the pockets are closed.

29. The arrangement for packaging magnets as claimed in  
25 claim 28 wherein the interior of the pockets is coated with a substance that reduces rusting of the magnets.

29. The arrangement for packaging magnets, as claimed in claim 28 wherein the pockets are charged with a substance  
30 that reduces rusting of the magnets.